Diadromous Fish Monitoring in Mill River and Lake Sabbatia, Taunton MA

Brad Chase - MA Division of Marine Fisheries

March 1, 2022 - Taunton City Council

Presentation Outline

1. Restoration Update
2. Lake Sabbatia Habitat Assessment
3. Lake Sabbatia Video Monitoring
4. Lake Sabbatia Eel Ramp and Tagging

Commonwealth of Massachusetts
Department of Fish & Game

MarineFisheries
Commonwealth of Massachusetts

Mill River Cooperative Restoration

The Nature Conservancy
Protecting nature. Preserving life.™

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SRPEDD

Commonwealth of Massachusetts
Division of Ecological Restoration

Taunton River Watershed Alliance

Commonwealth of Massachusetts
Department of Fish & Game

National Oceanic and Atmospheric Administration
NOAA
U.S. Department of Commerce

U.S. Fish & Wildlife Service
Department of the Interior

Department of Conservation and Recreation
dcr
Massachusetts

Taunton
A Town 1639 A City 1864

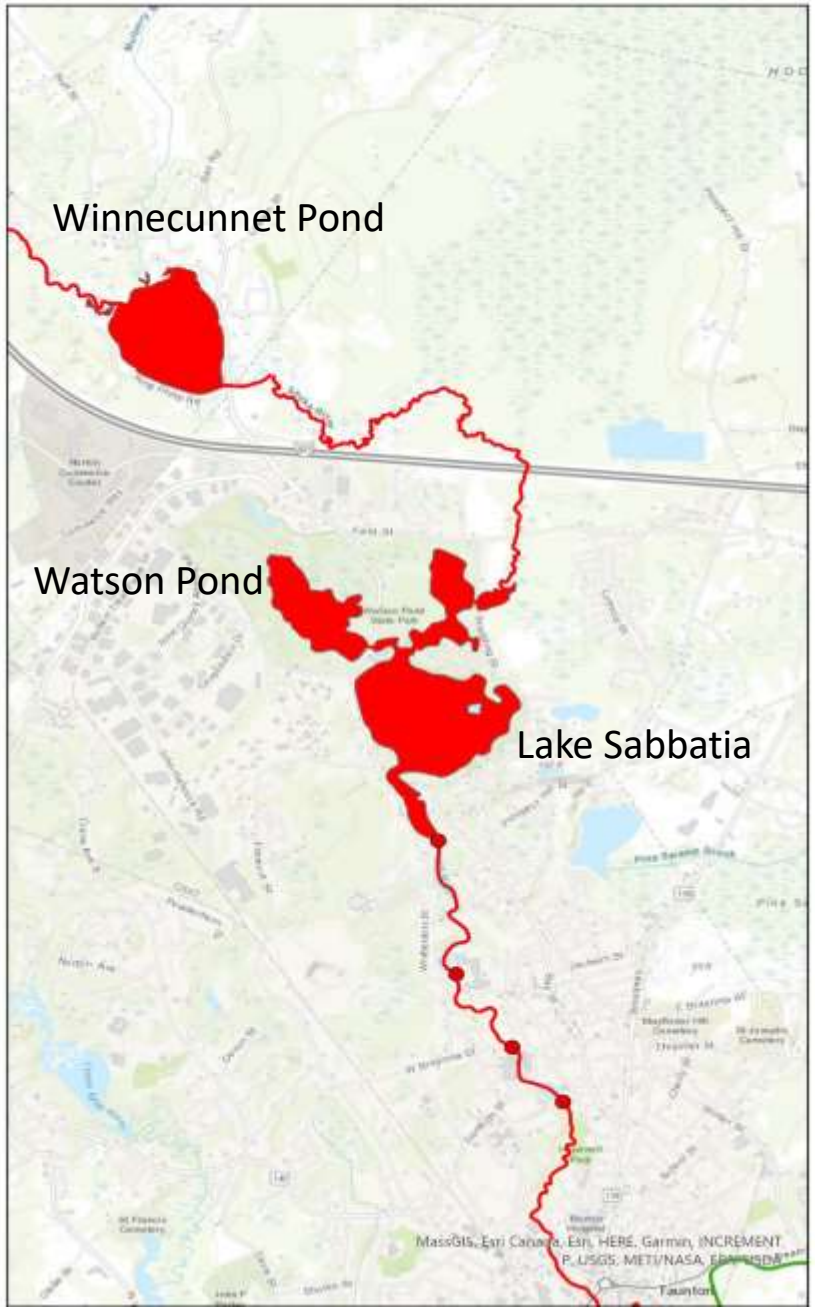
MarineFisheries
Commonwealth of Massachusetts

Diadromous Fish in Massachusetts

- rainbow smelt
- American eel
- alewife
- blueback herring
- American shad
- white perch
- sea lamprey
- Atlantic tomcod
- sea-run trout
- striped bass

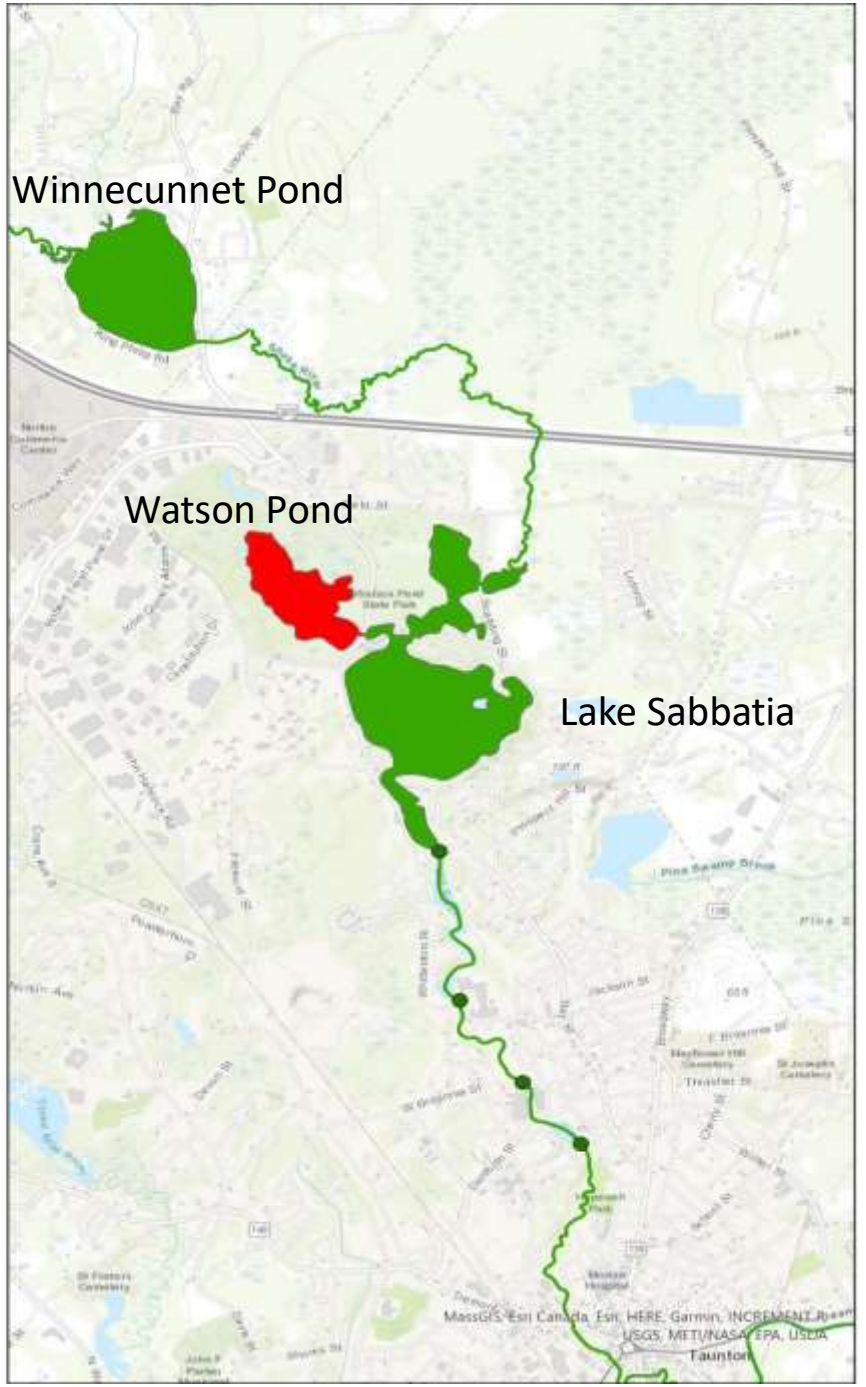

MAR 21 2012

Mill River Watershed Restoration



2011

Mill River Watershed Restoration



Mill River Diadromous Fish Monitoring

1. **River herring** – annual video count
2. **American eel** – annual ramp count and lake tagging
3. **Sea Lamprey** – annual spawning redd survey

Lake Sabbatia Fishway Video Monitoring

Installed video monitoring station at fishway in 2016

Sharp rise in river herring in spawning run after last dam removed

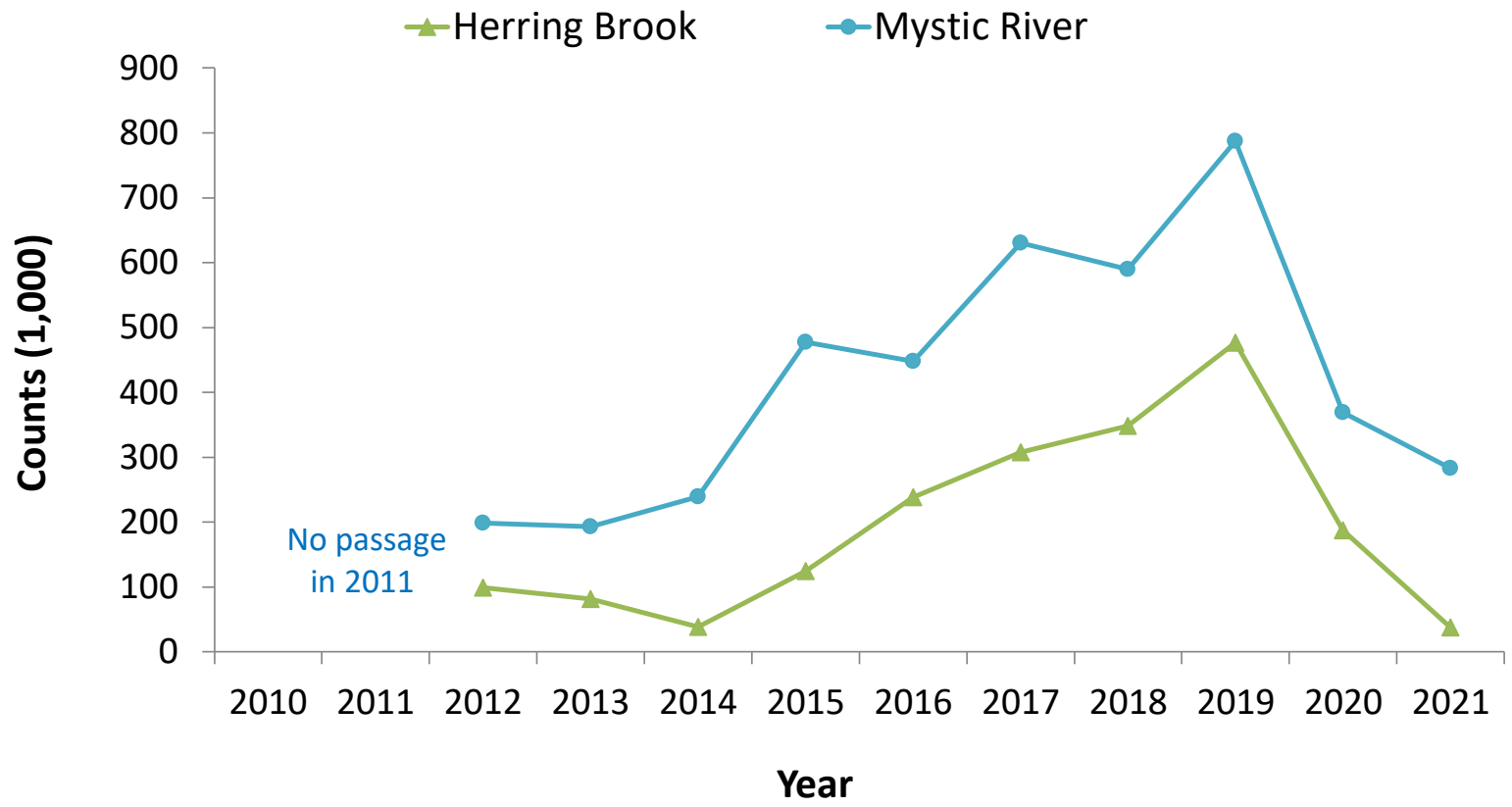
5 species of diadromous fish
10 species of freshwater fish
(3 species of trout and river otter)

May shift to electronic counter after 2022 season (grant ends)

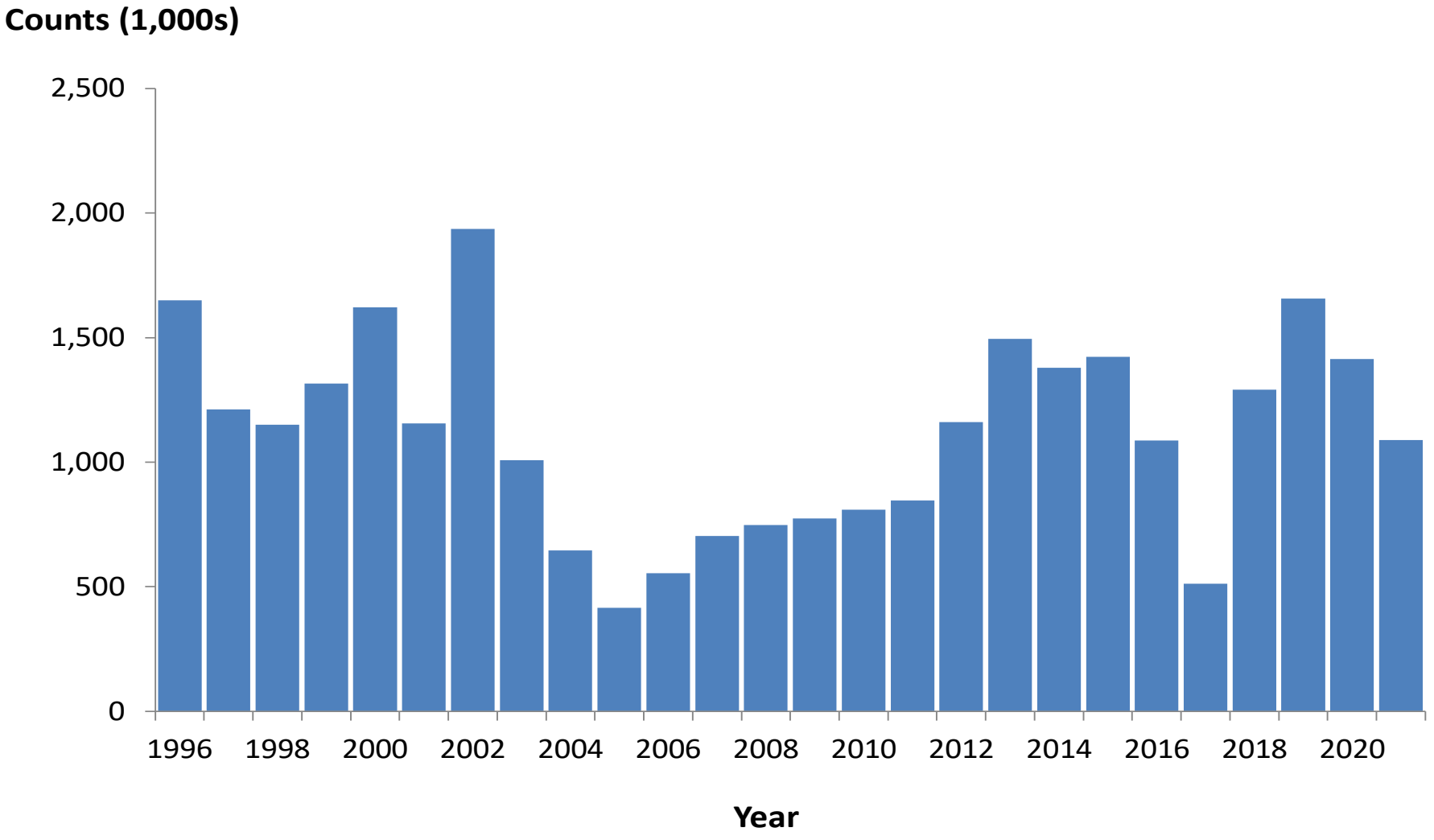
Post-Restoration Spawning Run Improvement

Herring Brook, Pembroke

Mystic River, Medford

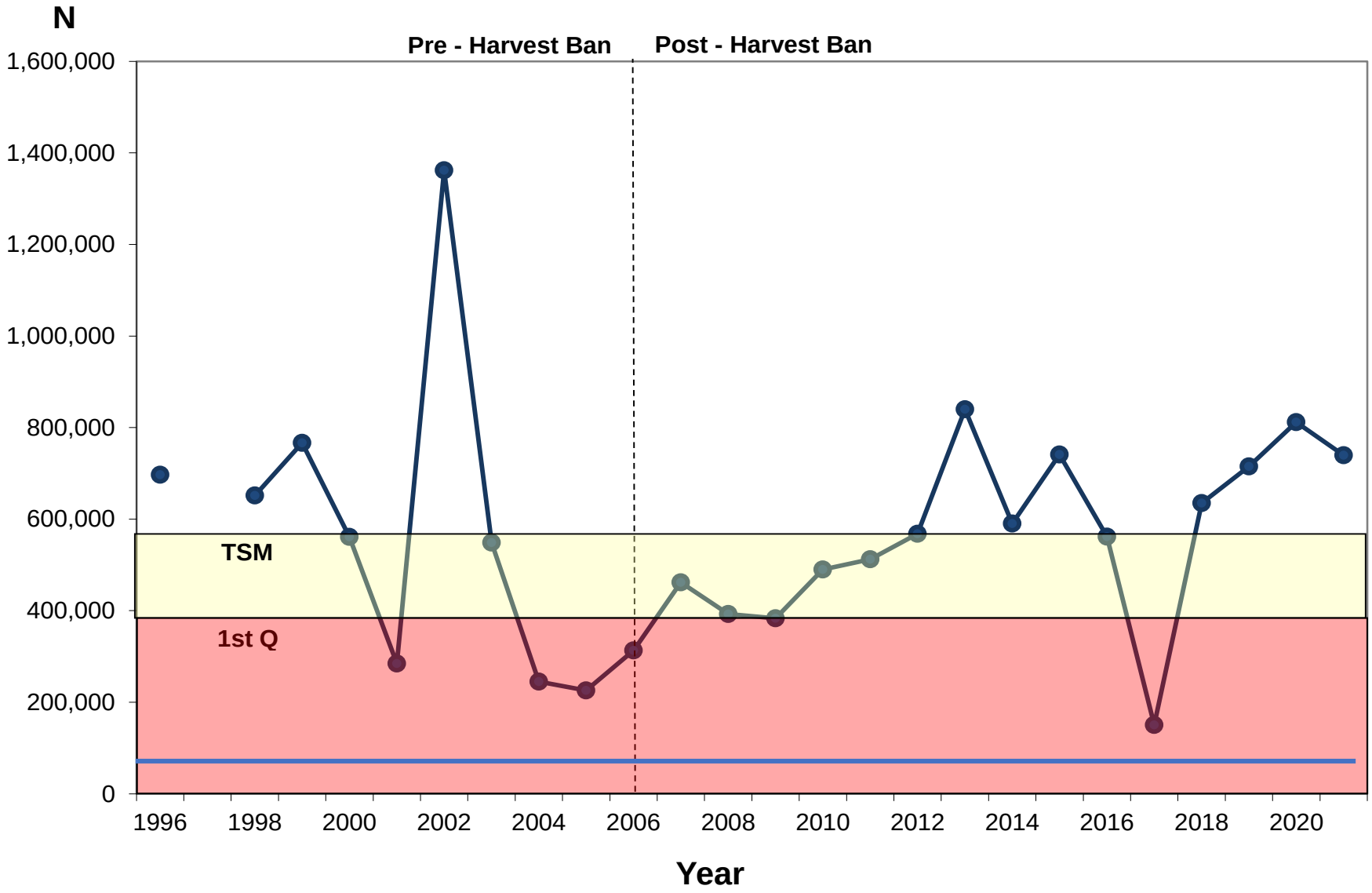


Massachusetts River Herring 20-Year Count Index 1996 - 2021



Nemasket River, Mattapoisett River, Monument River and Back River

Nemasket River - Visual Count 1996 - 2021



River Herring Habitat Assessment

- Monitored Lake Sabbatia, Watson Pond, and Winnecunnet Pond (2013-2014)
- Extensive summer anoxia and hypoxia
- Dense biomass of invasive plants - fanwort and variable milfoil
- Found invasive water chestnut in 2018

River Herring Habitat Assessment: Classification Results (red = exceedance)

	Criteria	Sabbatia exceedances	Watson exceedances	Winnecunnet exceedances
Temperature	≤ 28.3/26 °C	0	9.5%	1%
DO	≥ 5.0	51%	11%	52%
pH	6.5 – 8.3	61%	14%	46%
TN	≤ 0.32	97%	53%	73%
TP	≤ 8.0	100%	100%	100%

Recommendations:

- Watson passage
- Invasive plant management
- Nutrient management

American Eel - Unique Biology

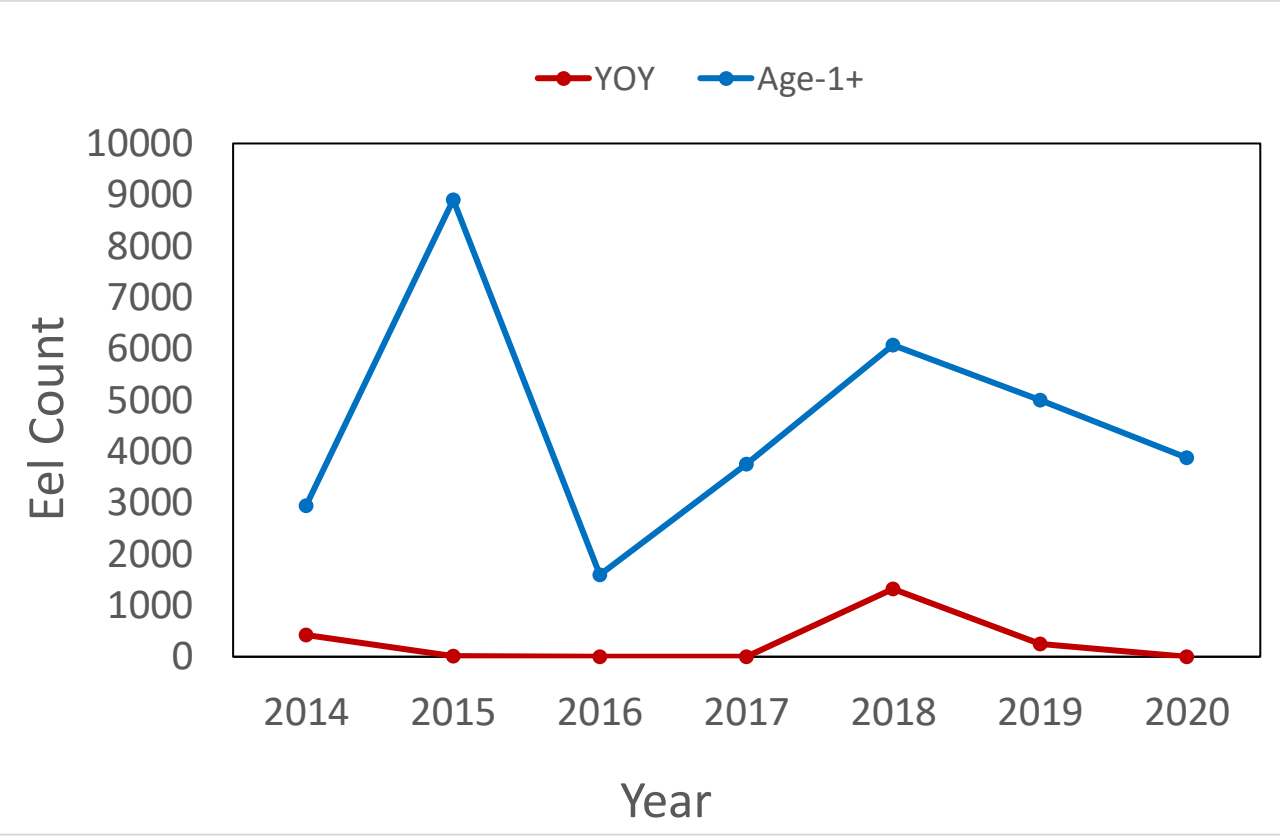
- Catadromous (born at sea)
- Panmictic (no homing)
- Semelparous (spawn and die)

- High age of maturity (8-15 years old)
- High fecundity (3-10 million eggs)
- Geographic range (Greenland to Brazil)

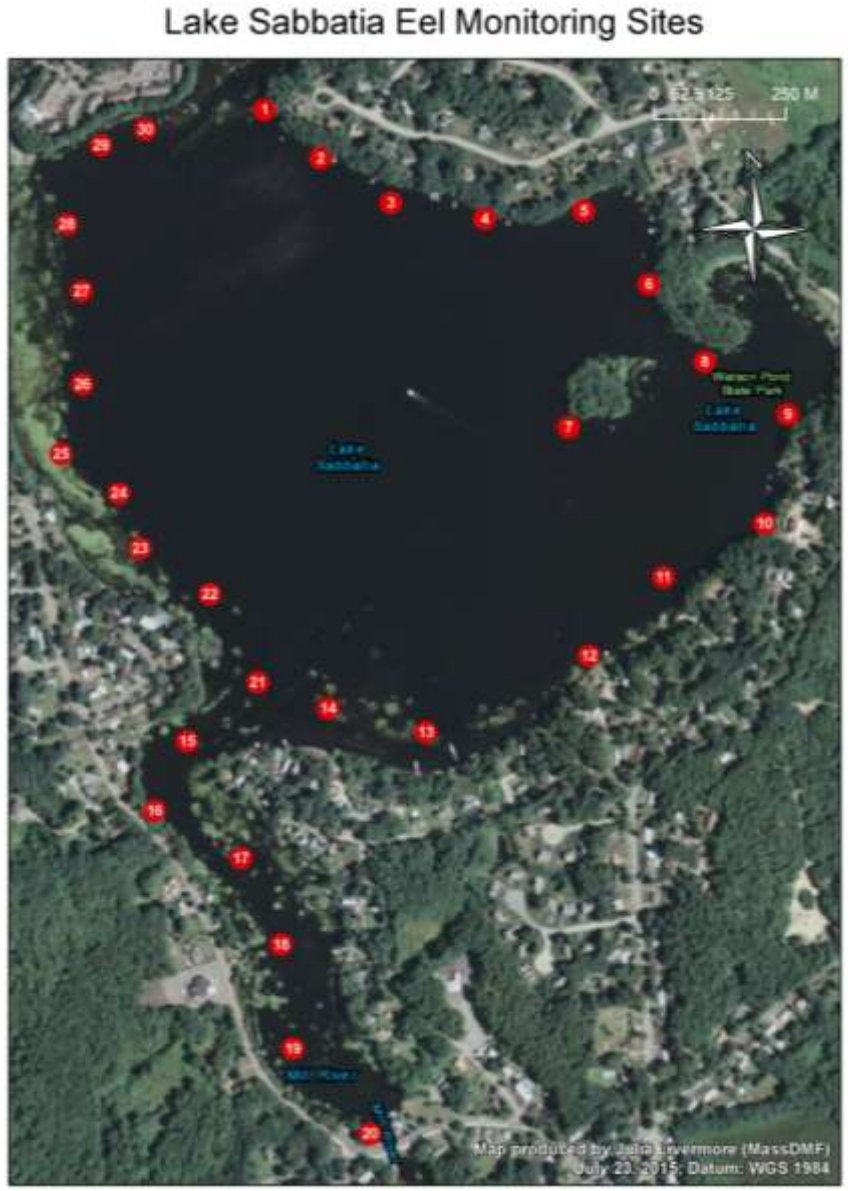
Highly Successful Fish

Lake Sabbatia Eel Ramp

- Custom eel ramp designed, fabricated and installed by DMF in 2014



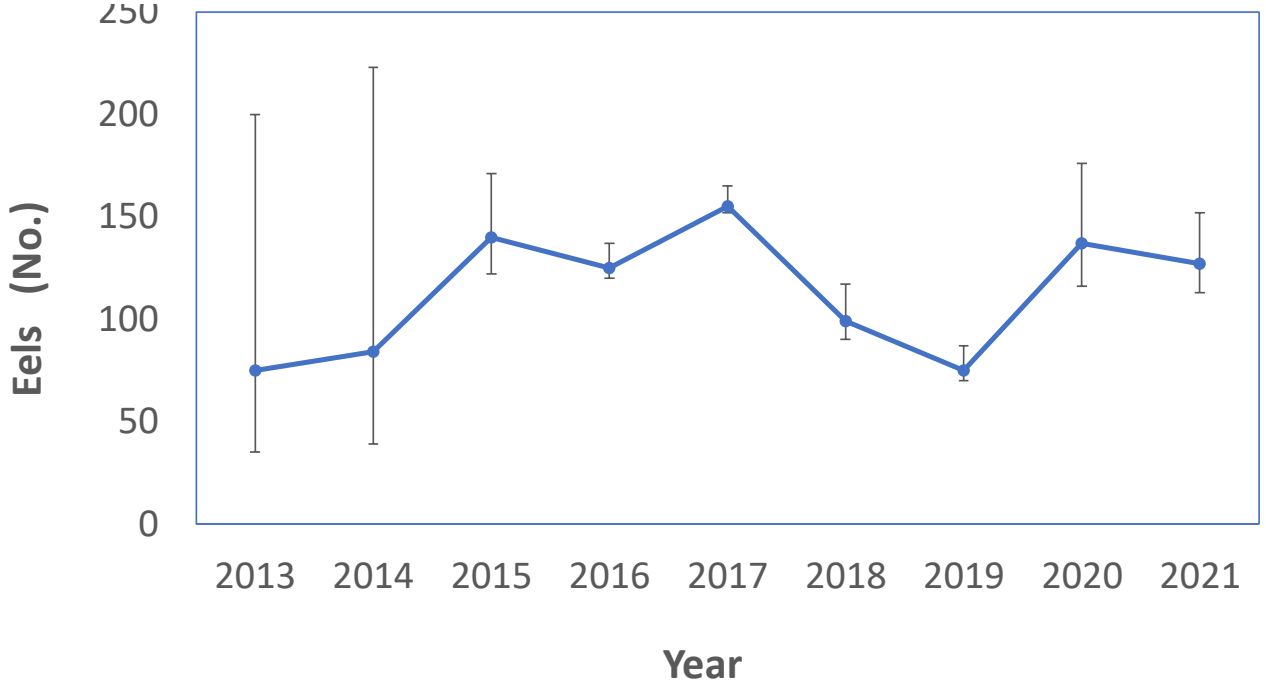
Lake Sabbatia Eel Abundance Study



Evaluating the Effect of Dam Removals on Yellow-Phase American Eel Abundance in a Northeastern U.S. Watershed

Sara M. Turner, Bradford C. Chase, and Michael S. Bednarski

North American Journal of Fisheries Management, April 2018



- Anoxia limiting eel habitat use
- Relatively low abundance given Lake size
- 2022 may be last year of study

Sea Lamprey - Redd Survey

- Male lamprey build nests in gravel and compete for female interest
- Conduct survey 2014-2021 at Hopewell Mills site in mid-June
- Documenting 10-40 redds annually

Successful spawning of anadromous *Petromyzon marinus* L. (sea lamprey) in a restored stream channel following dam removal.

Livermore, J.M., M. Trainor, and M. Bednarski

Northeastern Naturalist 24 (3): 380-390 2017

Fishway Operations

Fishway Operation and Maintenance Plan -2012/2014

Pond Level Target 60.5 ft

Fishway Target 60.85 ft (30 cfs / 2.5 ft in baffles)

Upstream Migration Period March 15th to June 30th
Downstream Migration Period July 1st to Nov. 15th
Eel Ramp Period March 31st to Oct. 31st

Drawdown Period Start - Oct. 15th
Recharge start - March 15th
Recharge complete - April 15th

Recommendations

1. **Invasive plant control**
2. **Watershed nutrient reduction**
3. **Create fish passage into Watson Pond**
4. **Continued coordination on drawdown, dam operations and fish passage operations**